CLAIMS:

1   1.   A method for indicating curve connection continuity information in a graphical

2   design system comprising the steps of:

3   (a) receiving a definition of a first curve and a second curve, the first and second curves

4   substantially meeting at a junction point;

5   (b) displaying the first and second curves on a display device;

6   (c) determining a G2 through Gn continuity value between the first and second curves at

7   the junction point, $n \geq 3$; and

8   (d) displaying at least one Gm tag indicating the value of Gm continuity, $2 \leq m \leq n$.

1   2.   The method of claim 1 wherein the displaying step comprises displaying a G2 tag

2   indicating the value of G2 continuity and a G3 tag indicating the value of G3 continuity.

1   3.   The method of claim 1 wherein the displayed at least one Gm tag is displayed in

2   association with the junction point.

1   4.   The method of claim 1 wherein, if the measure of Gm continuity is less than a

2   predefined value, the Gm tag is in a respective first display format and otherwise the Gm tag is in

3   a respective second display format.

1   5.   The method of claim 1, further comprising the steps of:

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2   determining a value of G1 continuity between the first and second curves at the junction

3 point; and

4   displaying a G1 tag indicating the value of G1 continuity.

1   6.   The method of claim 5, wherein:

2   the value of G1 continuity is an angle alpha between a first line normal to the first curve

3 at the junction point and a second line normal to the second curve at the junction point;

4   the G1 tag being displayed in association with the junction point.

1   7.   The method of claim 6, wherein the G1 tag comprises a numeric indication of the

2 angle alpha.

1   8.   The method of claim 6, further comprising the step of displaying a representation

2 of the first line and the second line, the G1 tag being displayed adjacent the representation.

1   9.   The method of claim 1, further comprising the step of determining a value of G1

2 continuity between the first and second curves at the junction point;

3   the step of displaying comprising displaying the G2 tag when a value of G1 continuity

4 between the first and second curves at the junction point is less than a predefined G1 value.

1   10.   The method of claim 1, wherein the value of G2 continuity is a difference delta

2 between an amplitude of curvature of the first curve at the junction point and an amplitude of

3 curvature of the second curve at the junction point.

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1   11.   The method of claim 10, wherein the G2 tag comprises a numeric indication of

2   the difference delta.

1   12.   The method of claim 10, further comprising the step of displaying a graphical

2   representation of the difference in amplitude between the curvature of the first curve and the

3   curvature of the second curve at the junction point, the G2 tag being displayed adjacent the

4   representation.

1   13.   The method of claim 1, further comprising the step of determining a value of G1

2   continuity between the first and second curves at the junction point;

3   the step of displaying comprising displaying a G3 tag when the value of G1 continuity is

4   less than a predefined G1 value.

1   14.   The method of claim 1, wherein:

2   a value of G3 continuity is an angle beta between a first line tangent to a curvature

3   envelope of the first curve at the junction point and a second line tangent to a curvature envelope

4   of the second curve at the junction point.

1   15.   The method of claim 14, wherein the G3 tag comprises a numeric indication of

2   the angle beta.

1   16.   The method of claim 14, further comprising the step of displaying a

2   representation of the first line and the second line, the G3 tag being displayed adjacent the

3   representation.

1   17.   The method of claim 1, wherein:

2   the first curve lies on a first surface defined in the graphical design system;

3   the second curve lies on a second surface defined in the graphical design system and

4   intersecting the first surface;

5   the first and second curves being coplanar with a cutting plane that intersects the first

6   surface and the second surface, the junction point lying at the intersection between the first and

7   second surfaces and the cutting plane.

1   18.   The method of claim 17, wherein the first and second curves are defined by the

2   intersection between the cutting plane and the first and second surfaces, respectively.

1   19.   A graphical design system comprising

2   a design editor;

3   a display; and

4   a storage area containing a graphical model having first and second curves substantially

5   meeting at a junction point;

6   the graphical design system further comprising a curve connection analyzer configured

7   to:

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8   (c) determine a G2 through Gn continuity value between the first and second curves at

9   the junction point, $n \geq 3$; and

10   (c) signal the display system to display in conjunction with a display of the first and

11   second curves, at least one Gm tag indicating the value of Gm continuity, $2 \leq m \leq n$.

1   20.   The system of claim 19, wherein the curve connection analyzer is configured to

2   signal the display system to display a G2 tag indicating the value of G2 continuity and a G3 tag

3   indicating the value of G3 continuity.

1   21.   The system of claim 19, wherein the at least one Gm tag is displayed in

2   association with the junction point.

1   22.   The system of claim 19, wherein, for a displayed Gm tag, the curve connection

2   analyzer is configured to signal the display system to display the Gm tag is in a respective first

3   display format if the measure of Gm continuity is less than a predefined value, and otherwise

4   signal the display system to display the Gm tag in a respective second display format.

1   23.   The system of claim 19, wherein the curve connection analyzer is further

2   configured to:

3   determine a value of G1 continuity between the first and second curves at the junction

4   point; and

5   display a G1 tag indicating the value of G1 continuity.

1   24.   The system of claim 23, wherein the value of G1 continuity is an angle alpha

2 between a first line normal to the first curve at the junction point and a second line normal to the

3 second curve at the junction point;

4   the curve connection analyzer being configured to signal the display system to display the

5 G1 tag in association with the junction point.

1   25.   The system of claim 24, wherein the G1 tag comprises a numeric indication of the

2 angle alpha.

1   26.   The system of claim 24, wherein the curve connection analyzer is configured to

2 signal the display system to display a representation of the first line and the second line and

3 display the G1 tag adjacent the representation.

1   27.   The system of claim 19, wherein the value of G2 continuity is a difference delta

2 between an amplitude of curvature of the first curve at the junction point and an amplitude of

3 curvature of the second curve at the junction point.

1   28.   The system of claim 27, wherein the curve connection analyzer is further

2 configured to:

3   determine a value of G1 continuity between the first and second curves at the junction

4 point; and

5   signal the display system to display the G2 tag when the value of G1 continuity is less

6 than a predefined G1 value.

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1   29.   The system of claim 27, wherein the G2 tag comprises a numeric indication of the

2   difference delta.

1   30.   The system of claim 27, wherein the curve connection analyzer is configured to

2   signal the display system to display a graphical representation of the difference in amplitude

3   between the curvature of the first curve and the curvature of the second curve at the junction

4   point and display the G2 tag adjacent the representation.

1   31.   The system of claim 19, wherein the curve connection analyzer is configured to:

2   determine a value of G1 continuity between the first and second curves at the junction

3   point; and

4   signal the display system to display a G3 tag when the value of G1 continuity is less than

5   a predefined G1 value.

1   32.   The system of claim 19, wherein:

2   the value of G3 continuity is an angle beta between a first line tangent to a curvature

3   envelope of the first curve at the junction point and a second line tangent to a curvature envelope

4   of the second curve at the junction point.

1   33.   The system of claim 32, wherein a G3 tag comprises a numeric indication of the

2   angle beta.

1   34.   The system of claim 32, wherein the curve connection analyzer is configured to

2   signal the display system to display a representation of the first line and the second line and

3   display a G3 tag adjacent the representation.

1   35.   The system of claim 19 wherein:

2   the first curve lies on a first surface defined in the graphical model;

3   the second curve lies on a second surface defined in the graphical model and intersecting

4   the first surface; and

5   the first and second curves coplanar with a cutting plane that intersects the first surface

6   and the second surface, the junction point lying at the intersection between the first and second

7   surfaces and the cutting plane.

1   36   The system of claim 35, wherein the first and second curves are defined by the

2   intersection between the cutting plane and the first and second surfaces, respectively.

1   37.   A method for indicating curve connection continuity information in a graphical

2   design system comprising the steps of:

3   (a) receiving a definition of a first curve and a second curve, the first and second curves

4   substantially meeting at a junction point;

5   (b) displaying the first and second curves on a display device;

6   (c) determining values of G1 continuity, G2 continuity, and G3 continuity between the

7   first and second curves at the junction point;

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8   (d) if the value of G1 continuity is greater than a predefined G1 value, displaying a G1

9   tag in association with the junction point indicating the value of G1 continuity;

10   (e) displaying a G2 tag in association with the junction point indicating the value of G2

11   continuity, the G2 tag being in a first format if the value of G2 continuity is greater than a

12   predefined G2 value and otherwise being in a second format;

13   (f) if the value of G1 continuity is not greater than a predefined G1 value, displaying a G3

14   tag in association with the junction point indicating the value of G3 continuity, the G3 tag being

15   in the first format if the value of G3 continuity is greater than a predefined G3 value and

16   otherwise being in the second format.

1   38.   The method of claim 37, wherein:

2   the G1 tag comprises a numeric indication of an angle between a line normal to the first

3   curve at the junction point and a line normal to the second curve at the junction point;

4   the G2 tag comprises a numeric indication of a percent difference between an amplitude

5   of curvature of the first curve at the junction point and an amplitude of curvature of the second

6   curve at the junction point; and

7   the G3 tag comprises a numeric indication of an angle between a line tangent to a

8   curvature envelope of the first curve at the junction point and a line tangent to a curvature

9   envelope of the second curve at the junction point.

1   39.   A method for indicating surface connection continuity information in a graphical

2   design system comprising the steps of:

3   receiving a definition of a first surface and a second surface intersecting the first surface,

4   the intersection between the first and second surfaces defining an intersection edge;

5   specifying at least one cutting plane that intersects the first surface and the second

6   surface, the intersection between a respective cutting plane and the first and second surfaces

7   defining a respective first and second curve lying on the first and second surfaces, respectively,

8   and meeting at a respective junction point where the cutting plane crosses the intersection edge;

9   for each pair of first and second curves:

10   (a) determining a G2 through Gn continuity value between the first and second

11   curves at the junction point, $n \geq 3$; and

12   (b) displaying at least one Gm tag indicating the value of Gm continuity, $2 \leq m \leq n$.

1   40.   The method of claim 39, further comprising the step of displaying the first and

2   second curves in each pair of curves;

1   41.   The method of claim 39, wherein the at least one Gm tag is displayed in

2   association with the respective junction point.

1   42.   The method of claim 39, wherein a plurality of cutting surfaces are specified and

2   which cross the intersection edge at periodic intervals.

1   43.   A graphical design system comprising

2   a design editor;

3   a display; and

4   a storage area containing a graphical model having first and second intersecting surfaces,

5   the intersection between the first and second surfaces defining an intersection edge;

6 the graphical design system further comprising a curve connection analyzer configured

7 to, for a specified pair of curves comprising a first curve lying on the first surface and a second

8 curve lying on the second surface, the first and second curves meeting at a junction point lying

9 on the intersection edge:

10 (a) determine a G2 through Gn continuity value between the first and second

11 curves at the junction point, $n \geq 3$; and

12 (b) signal the display system to display in conjunction with a display of the first

13 and second surfaces at least one Gm tag indicating the value of Gm continuity, $2 \leq m \leq n$.

1 44. The system of claim 43, wherein the first curve is part of the definition of the first

2 surface in the graphical model.

1 45. The system of claim 43, wherein at least a portion of the first and second curves

2 are displayed on the display, the G2 tag and G3 tag being displayed in association with the

3 junction point.

1 46. The system of claim 43 wherein the first and second curves are defined by the

2 intersection between a cutting surface and the first and second surface respectively